

Intro to Linux

Fun with Linux Lab

Fun with Linux Materials

- Materials needed
 - Linux Virtual Machine
 - APT package manager

* Purpose: To build your skills in using the APT package manager.

- - You need to step thru each slide and execute them in
- - The cyber range.
- - After completing this, I provide further instructions.



APT Repository

- First thing you need to do is make sure your APT repository is up to date, run the following command in terminal:

```
sudo apt-get update
```

This is the simple command to update
the APT repository



Searching APT Repository

- The APT (Advanced Package Tool) is a tool to gain access to software repositories for certain Linux distros.
- Search a repository with the following command:
`sudo apt-cache search <what_to_search>`
- Install a program from the repository with the following command:
`sudo apt-get install <program_name>`



Installing From APT Repository

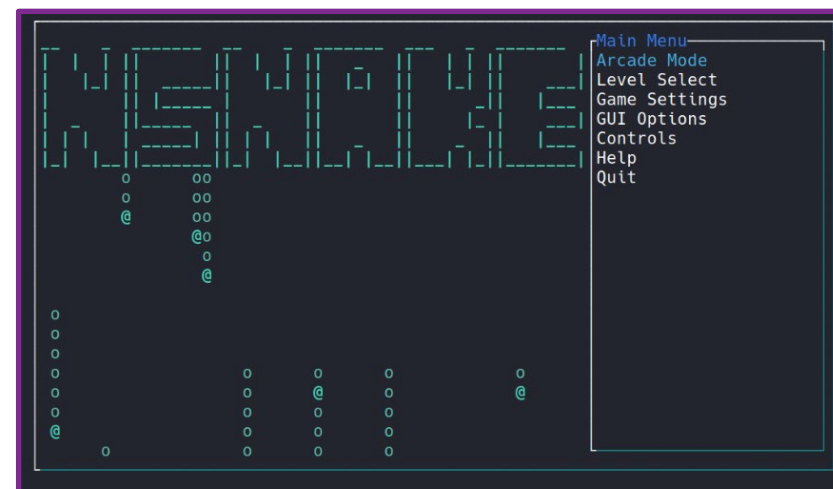
- Search for the computer game snake
`sudo apt-cache search snake`
- Find the game **nsnake**
 - Notice that nsnake is a classic snake game on the terminal
- Install nsnake
`sudo apt-get install nsnake`

```
node-change-case - Transform a string between different case conventions
node-lodash-packages - Lo-dash is a Node.js utility library (per method packages)
nsnake - classic snake game on the terminal
postgresql-16-snakeoil - PostgreSQL anti-virus scanner based on ClamAV
pyprof2calltree - visualise Python cProfile data with this kcachegrind converter
python3-maturin - Build and publish crates with pyo3
python3-milksnake - setuptools/wheel/cffi extension to embed a binary data in wheels
r-cran-snakecase - convert strings into any case for GNU R
ruby-awrence - Camelize your snake keys when working with JSON APIs
runsnakerun - GUI utility for (Python) cProfile or Profile profiler dumps
snake4 - Snake game
snakemake - pythonic workflow management system
snakemake-doc - documentation for pythonic workflow management system
trophy-data - data files for trophy
vonsh - Snake-like game with line of people running around to get more food
xscreensaver-gl - GL(Mesa) screen saver modules for screensaver frontends
kali@10.15.72.241-[]
$ sudo apt-get install nsnake
```



Uninstalling From APT Repository

- Once nsnake is installed, play nsnake with the following command:
`nsnake`
- Once done, use the following command to remove nsnake from the system:
`sudo apt-get remove nsnake`



```
The following packages will be REMOVED:
 nsnake
0 upgraded, 0 newly installed, 1 to remove and 1810 not upgraded.
After this operation, 398 kB disk space will be freed.
Do you want to continue? [Y/n] █
```

If you ever see a message like this, it's just asking if you're ok with making changes to the disk. You can just type "y" and hit ENTER to say yes.



Install cowsay, fortune, and lolcat

- Install cowsay
`sudo apt-get install cowsay`
- Install fortune
`sudo apt-get install fortune`
- Install lolcat
`sudo apt-get install lolcat`



cowsay

- Use cowsay with the following command:
cowsay Hello World
- What else can you get the cow to say?

```
(kali@10.15.20.28) - [~]
$ cowsay Hello World

  -----
< Hello World >
  -----
      \   ^__^
         (oo)\_____
            (__)\       )\/\
                ||----w |
                ||     ||
```



fortune

- Try out the fortune command:
fortune

```
(kali@10.15.20.28) - [~]
$ fortune
Tomorrow will be cancelled due to lack of interest.

(kali@10.15.20.28) - [~]
$ fortune
You have a will that can be influenced by all with whom you come in contact.

(kali@10.15.20.28) - [~]
$ fortune
Good day for a change of scene.  Repaper the bedroom wall.
```



fortune and cowsay

- Now make the cow say your fortune using the pipe (|) command:
`fortune | cowsay`

The pipe command allows two or more commands to be used where the output of the first command is used as the input for the next command

```
(kali@10.15.20.28) - [~]
$ fortune | cowsay

-----
/ Are you making all this up as you go \
\ along?                               /
-----

      ^  ^
      (oo)\_____
      (__)\       )\/\
           ||----w |
           ||


```



fortune and lolcat

- Try to use the lolcat command:
`fortune | lolcat`

```
(kali@10.15.20.28) - [~]  
$ fortune | lolcat  
Try to have as good a life as you can under the circumstances.
```



cowsay, fortune, and lolcat

- Have a cow say a fortune while using the lolcat
`fortune | cowsay | lolcat`

```
(kali@10.15.20.28) - [~]
$ fortune | cowsay | lolcat

-----
/ Change your thoughts and you change \
\ your world.                          /
-----

      ^ ^
      (oo)\_____
      (_____)\/    )\/\
           ||----w |
           ||     ||
```



What if you misspell “ls”?

- The command `ls` is used so often, and is typed in so quickly that it is misspelled as `sl`. Install the `sl` command:

```
sudo apt-get install sl
```

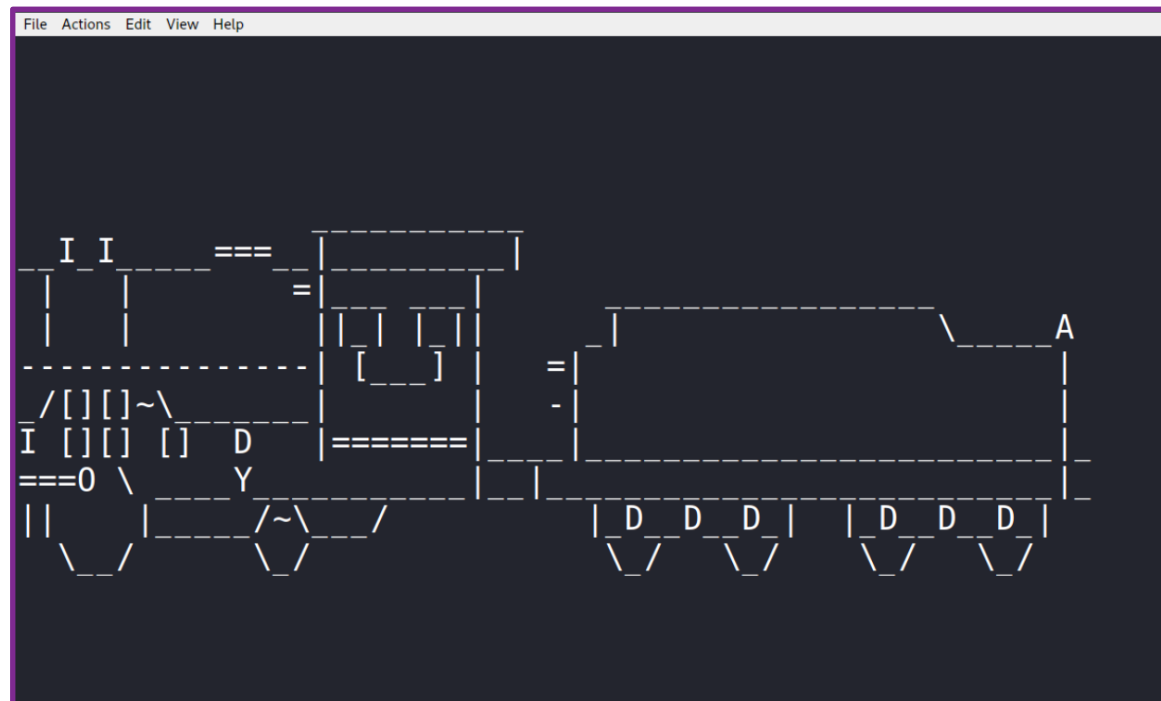
- After it's installed, use the `sl` command:

```
sl
```



What if you misspell “Is”?

- You should have seen a train go across the screen



What if you misspell “ls”?

- Let’s look at the manual for **sl**:
`man sl`
- What do the following flags do?
 - a
 - l
 - F
- Type “q” to leave the manual.

Almost every command has a manual in Linux, the manual can be found by typing “man” followed by the command

```
SL(6)                                     Games Manual                               SL(6)
NAME
    sl - display animations aimed to correct users who accidentally
        enter sl instead of ls.
SYNOPSIS
    sl [ -alFe ]
DESCRIPTION
    sl Displays animations aimed to correct users who accidentally
        enter sl instead of ls. SL stands for Steam Locomotive.
OPTIONS
    -a      An accident seems to happen. You'll feel pity for people
            who cry for help.
Manual page sl(6) line 1 (press h for help or q to quit)
```



What if you misspell “ls”?

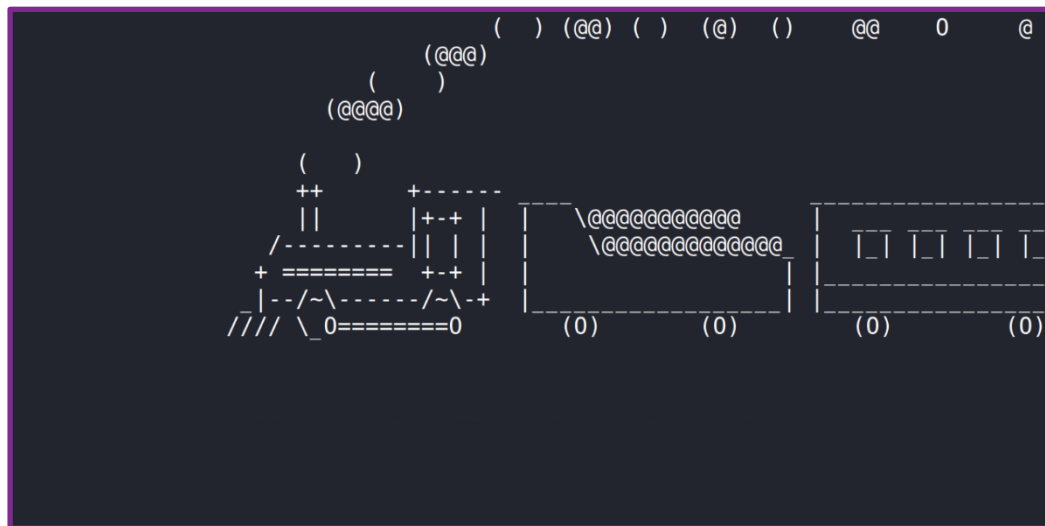
- Use those flags:

```
sl -a
```

```
sl -l
```

```
sl -F
```

- “-” is the terminals way to give arguments for commands



```
( ) (@@) ( ) (@) ( ) @@ 0 @
  (@@)
  (
  (@@@)

  ( )
  ++      +-----
  ||      |++
  /-----| |
  + ===== +--+
  |---/~\-----/~\--+
  /// \_0=====0

  \@@@@@@@@@@@
  \@@@@@@@@@@@

  | | | | | | |
  | | | | | | |
  | | | | | | |
  | | | | | | |

  (0) (0) (0) (0)
```



Cat and Mouse

- Want to play cat and mouse?
- Run the following commands to install oneko
`sudo apt-get install oneko`

`oneko` <-- Runs the program

- What happens?



Cat and Mouse

You should see a cat chasing your mouse around on the screen

```
Processing triggers for desktop-file.  
Processing triggers for man-db (2.9.4  
Processing triggers for mailcap (3.70  
  
(kali@10.15.20.28) - [~]  
$ oneko
```

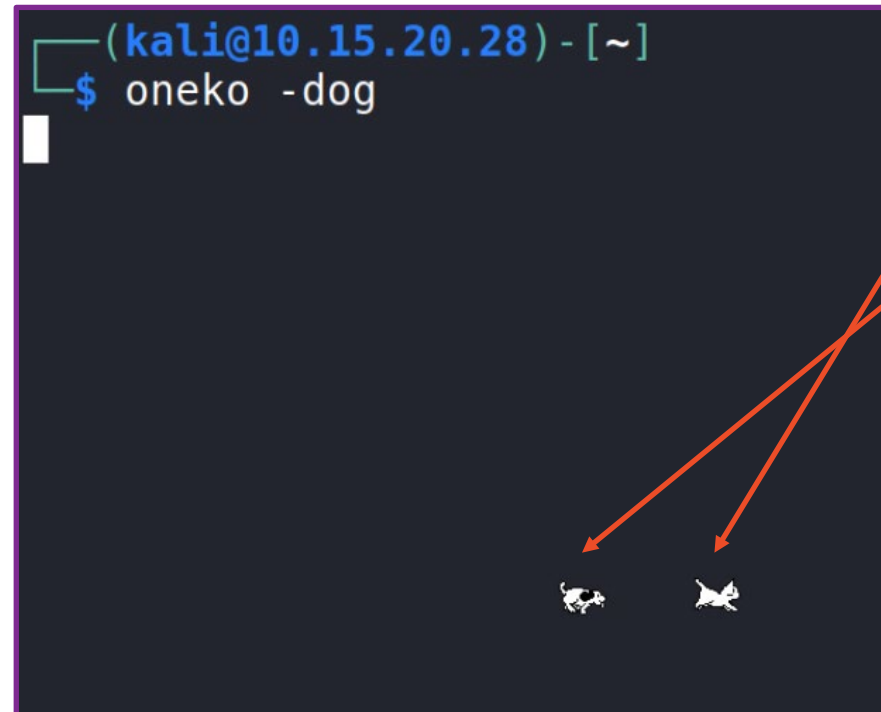
Notice that the cursor goes to the next line, this Terminal is controlling the cat (controlling this "process" in the foreground)



Cat and Dog

- Leave oneko running and open a new Terminal
- Let a dog chase the mouse as well
 - `oneko -dog`

```
(kali@10.15.20.28) - [~]  
$ oneko -dog  
█
```

A terminal window with a dark background. The prompt is '(kali@10.15.20.28) - [~]'. The command '\$ oneko -dog' has been entered. Below the command, there are two small white icons: a cat on the left and a dog on the right. A white cursor is visible on the line following the command.

A cat and dog



Cat and Dog

- Press CTRL + C in the Terminal controlling the dog process to stop the dog

CTRL+C is the kill
command and stops/kills
a process running in the
Terminal

```
(kali@10.15.20.28) - [~]  
$ oneko -dog  
^C
```

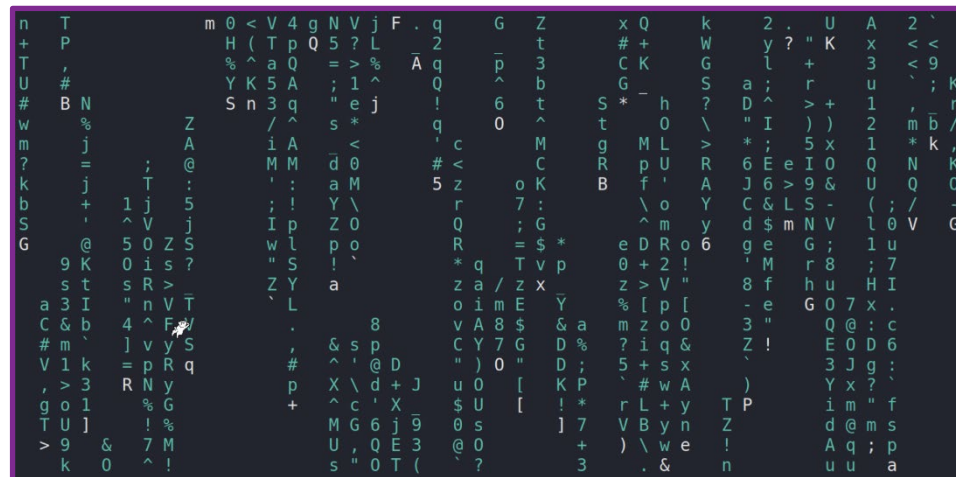


Take the Red or Blue Pill?

- Want to turn your computer into the Matrix?
`sudo apt-get install cmatrix`

`cmatrix` <---Runs the program

It looks even better in full screen!



CTRL+C will stop
`cmatrix`



Take the Red or Blue Pill?

- Open the manual for cmatrix
- What does the manual say will happen if you press the “\$” while the cmatrix command is running?

This line tells what the \$ being pressed will change in the `cmatrix` program

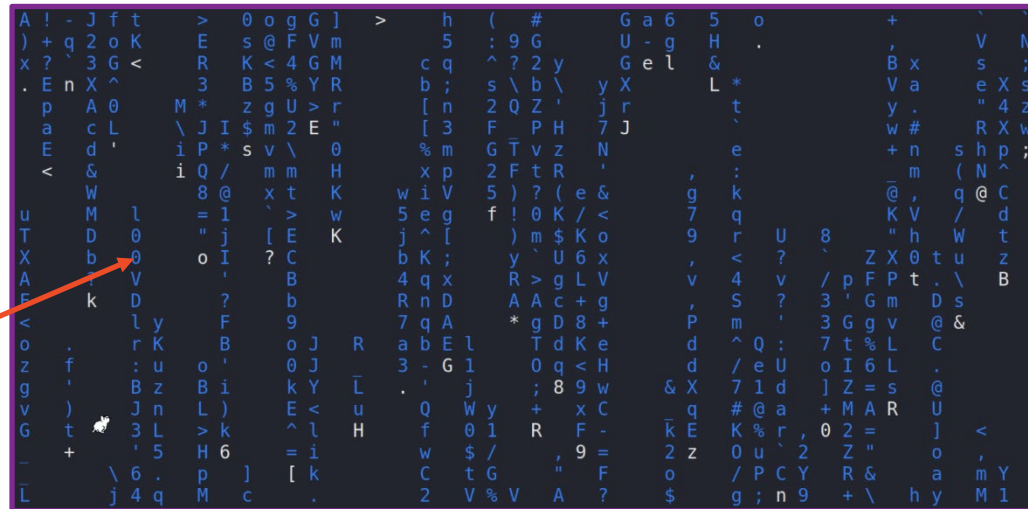
```
0-9   Adjust update speed
! @ # $ % ^ & ) Change the color of the matrix to the corresponding color: ! -
red, @ - green, # - yellow, $ - blue, % - magenta, ^ - cyan, & -
white, ) - black.
q     Quit the program
JGS
This program is very CPU intensive. Don't be surprised if it eats up
```



Take the Red or Blue Pill?

- Run the cmatrix program and then press the \$.

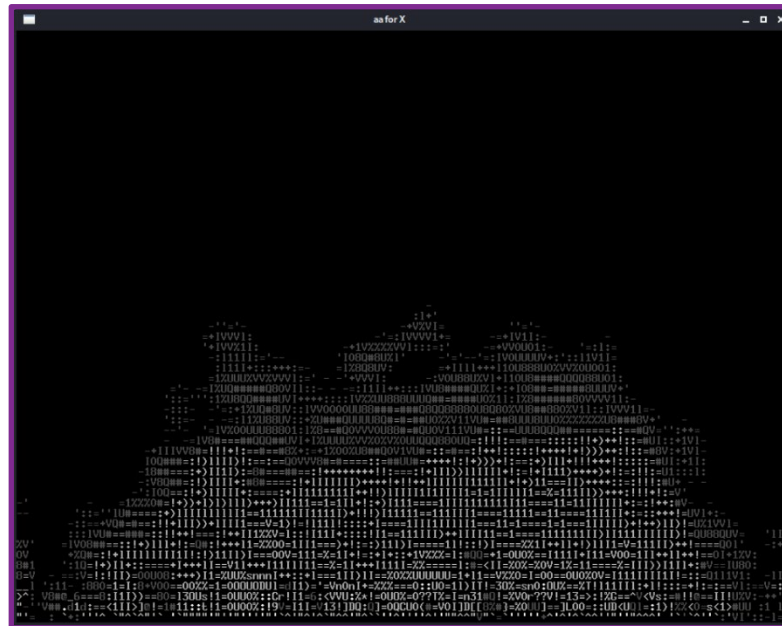
You should notice the Matrix turn from green to blue!



Are You Cold?

- Then start a fire
`sudo apt-get install libaa-bin`

`aafire` <---starts the fire



Are You Cold?

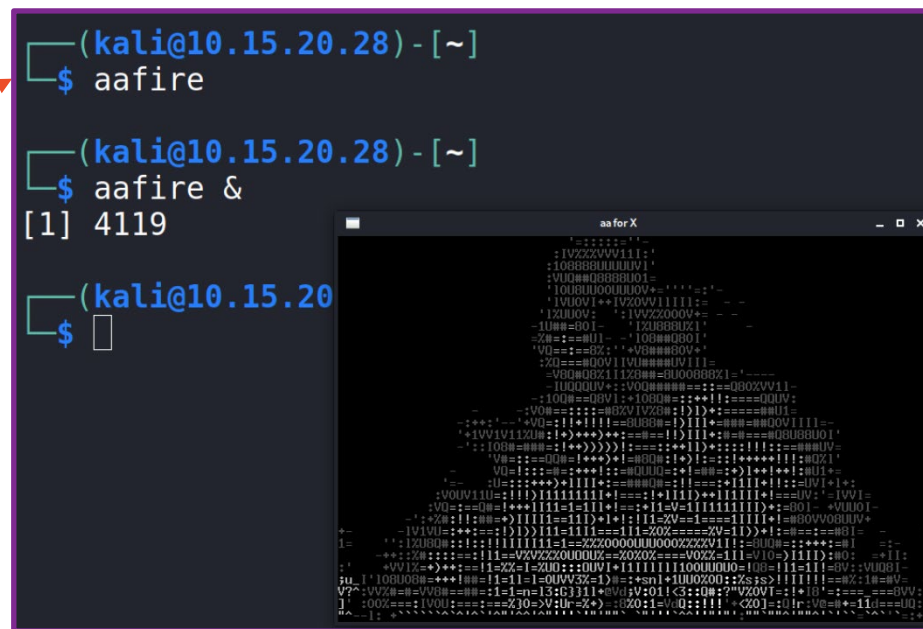
- Press “q” to exit the fire
- Restart the fire but use the “&” after the command:
`aafire &`

Notice the “aafire” job is backgrounded and you are able to type another command. The “&” pushes a command/process to the background.

```
(kali@10.15.20.28) - [~]
$ aafire

(kali@10.15.20.28) - [~]
$ aafire &
[1] 4119

(kali@10.15.20.28) - [~]
$
```

The image shows a terminal window with a dark background. The prompt is (kali@10.15.20.28) - [~]. The user enters '\$ aafire', followed by '\$ aafire &', and then '[1] 4119'. The prompt returns to '\$'. An orange arrow points from the text on the left to the terminal output. To the right, a smaller window titled 'aafire X' is visible, displaying a complex ASCII art fire graphic.

New Identity?

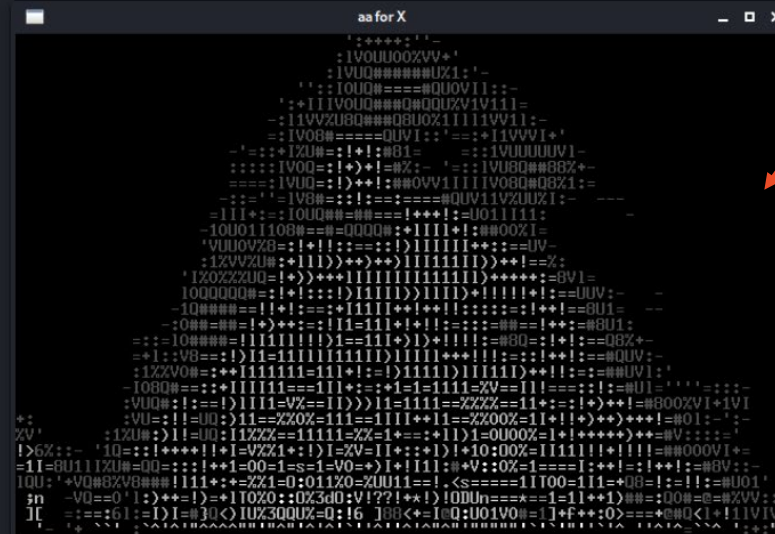
```
sudo apt-get install rig
```

```
rig <----Creates a new identity
```

```
(kali@10.15.20.28) - [~]
└─$ rig
Mercedes Knight
706 First St
Pasadena, CA 91109
(818) xxx-xxxx

(kali@10.15.20.28) - [~]
└─$ rig
Terrie Pitts
117 Cimenny Rd
Raleigh, NC 27611
(919) xxx-xxxx

(kali@10.15.20.28) - [~]
└─$
```



Cozy fire still displayed



Read the Manual

- Where does the `rig` command get these “identities” from?
- Open the `rig` manual
`man rig`
- Look for FILES section

FILES

```
/usr/share/rig/locdata.idx  
/usr/share/rig/street.idx  
/usr/share/rig/fnames.idx  
/usr/share/rig/mnames.idx  
/usr/share/rig/lnames.idx
```

The file that the rig
command pulls street
names from



Display the File

- Use the concatenate command to display the contents of the street names file:

```
cat <path_to_file>/street.idx
```

The `cat` command displays the text of a file into the Terminal

```
(kali@10.15.20.28) - [~]  
└─$ cat /usr/share/rig/street.idx  
Sunrise Rd  
Stonehedge Blvd  
Midland St  
Tulip St  
Beley Rd  
Bryant Blvd  
Hamlet St  
Willow Rd  
Limetree Ln  
Genesse Blvd  
West Street Terr  
Spring County Blvd  
North Hampton St  
Erming Ln  
Ellis Terr
```

List of street names the `rig` command pulls from



Nano Text Editor

- Want to add streets to rig? Open the nano editor to add streets:

```
sudo nano <path_to_file>/street.idx
```

```
(kali@10.15.20.28) - [~]  
$ sudo nano /usr/share/rig/street.idx
```

```
GNU nano 5.8 /usr/share/rig/street.idx  
Sunrise Rd  
Stonehedge Blvd  
Midland St  
Tulip St  
Beley Rd  
Bryant Blvd  
Hamlet St  
Willow Rd  
Sesame St  
Limetree Ln  
Genesse Blvd  
West Street Terr  
Spring County Blvd  
North Hampton St
```

The nano editor



Leaving Nano

- Add street names!
 - To Exit the nano editor
 - Press CTRL+x to exit
 - Press “y” for yes that you want to save
 - Hit ENTER to confirm the file name
- Use the `rig` command until you see one of your new streets!

```
GNU nano 5.8 /usr/share/rig/street.idx
Manchester St
New First Rd
Burnet Dr
Pleasant View Dr
Fairfield Rd
Anton Dr
Sharon Rd
Lake Dr
Plymth Terr
Lemoyer Blvd
Brown St
Someplace Rd
Anywhere Blvd
Sunset Dr
```

Added street names



Aquarium? Yes Please!

- Open a new Terminal
- Navigate to the Desktop
`cd Desktop`
- Download the ascii aquarium files

```
wget http://www.robobunny.com/projects/asciiquarium/asciiquarium.tar.gz
```

```
(kali@10.15.20.28) - [~]
└─$ cd Desktop

(kali@10.15.20.28) - [~/Desktop]
└─$ wget http://www.robobunny.com/projects/asciiquarium/asciiquarium.tar.gz
--2023-07-05 18:45:19-- http://www.robobunny.com/projects/asciiquarium/asciiquarium.tar.gz
Resolving www.robobunny.com (www.robobunny.com)... 71.158.88.45
Connecting to www.robobunny.com (www.robobunny.com)|71.158.88.45|:80... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://robobunny.com/projects/asciiquarium/asciiquarium.tar.gz [following]
--2023-07-05 18:45:19-- https://robobunny.com/projects/asciiquarium/asciiquarium.tar.gz
Resolving robobunny.com (robobunny.com)... 71.158.88.45
Connecting to robobunny.com (robobunny.com)|71.158.88.45|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 15436 (15K) [application/gzip]
Saving to: 'asciiquarium.tar.gz'

asciiquarium.tar.gz  100%[=====] 15.07K  ---KB/s  in 0.001s
2023-07-05 18:45:19 (19.3 MB/s) - 'asciiquarium.tar.gz' saved [15436/15436]
```

The **wget** command retrieves content from web servers

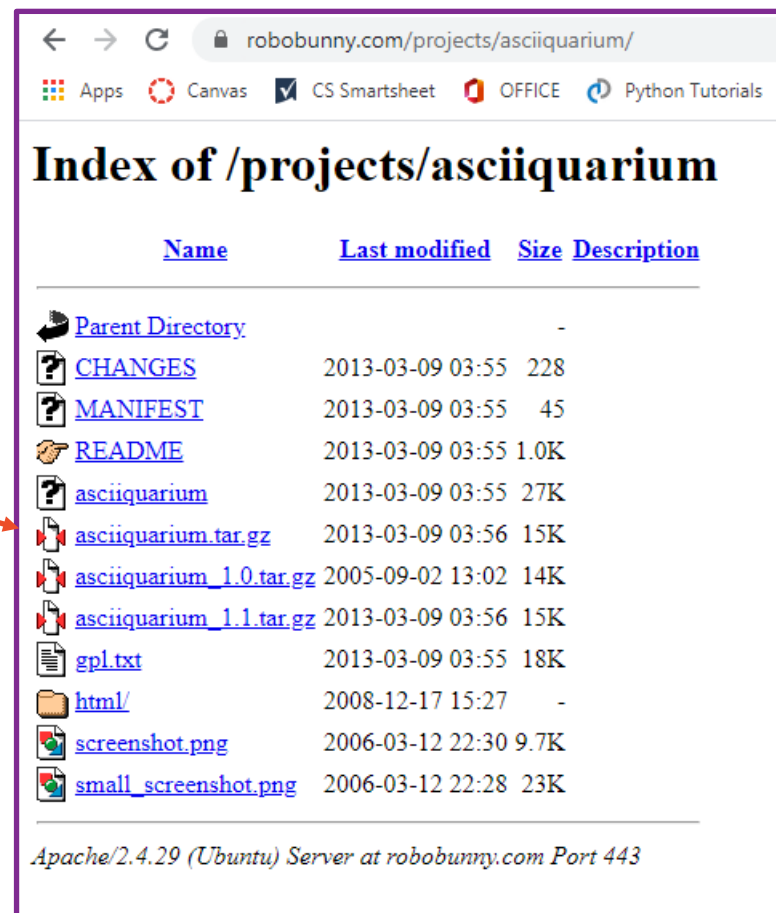
You should see the **asciiquarium.tar.gz** file appear on your Desktop



Webserver Directory - wget

This is the website for www.robobunny.com/projects/asciiquarium/, the `wget` command goes to this website and pulls the `asciiquarium.tar.gz` file from this website

What is a tar.gz file? It is similar to a .zip file, it is a much larger file that is compressed down to a much smaller file



robobunny.com/projects/asciiquarium/

Apps Canvas CS Smartsheet OFFICE Python Tutorials

Index of /projects/asciiquarium

Name	Last modified	Size	Description
Parent Directory		-	
CHANGES	2013-03-09 03:55	228	
MANIFEST	2013-03-09 03:55	45	
README	2013-03-09 03:55	1.0K	
asciiquarium	2013-03-09 03:55	27K	
asciiquarium.tar.gz	2013-03-09 03:56	15K	
asciiquarium_1.0.tar.gz	2005-09-02 13:02	14K	
asciiquarium_1.1.tar.gz	2013-03-09 03:56	15K	
gpl.txt	2013-03-09 03:55	18K	
html/	2008-12-17 15:27	-	
screenshot.png	2006-03-12 22:30	9.7K	
small_screenshot.png	2006-03-12 22:28	23K	

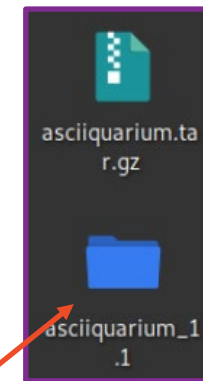
Apache/2.4.29 (Ubuntu) Server at robobunny.com Port 443

Decompressing the Files

- Decompress the file using the following command:
`tar -zxvf asciiquarium.tar.gz`

```
(kali@10.15.20.28) - [~/Desktop]  
$ tar -zxvf asciiquarium.tar.gz
```

- x extracts the files
- f denotes the file
- z filters the .gz



You should see the asciiquarium_1.1 directory appear on your Desktop! This file has been decompressed/unzipped and brought to the Desktop

Navigate to the Folder

- Navigate into the asciiquarium_1.1 folder
`cd asciiquarium_1.1`
- List out the files
`ls`

```
(kali@10.15.20.28) - [~/Desktop/asciiquarium_1.1]
$ ls
CHANGES  MANIFEST  README  asciiquarium  gpl.txt
```

You should see the asciiquarium program as well as the README document!



Execute the Program?

- Try to use the following command:
`./asciiquarium` or `sudo ./asciiquarium`
 - You should have received “command not found”

The dot slash executes a program

```
(kali@10.15.20.28) - [~/Desktop/asciiquarium_1.1]
└─$ ./asciiquarium
bash: ./asciiquarium: Permission denied

(kali@10.15.20.28) - [~/Desktop/asciiquarium_1.1]
└─$ sudo ./asciiquarium
sudo: ./asciiquarium: command not found
```

The asciiquarium program is not executable at this point



Change Mode

- Make the asciiquarium file executable
`chmod +x asciiquarium`
- Use `ls` to check that it is now executable
`ls`

```
(kali@10.15.20.28) - [~/Desktop/asciiquarium_1.1]
└─$ chmod +x asciiquarium

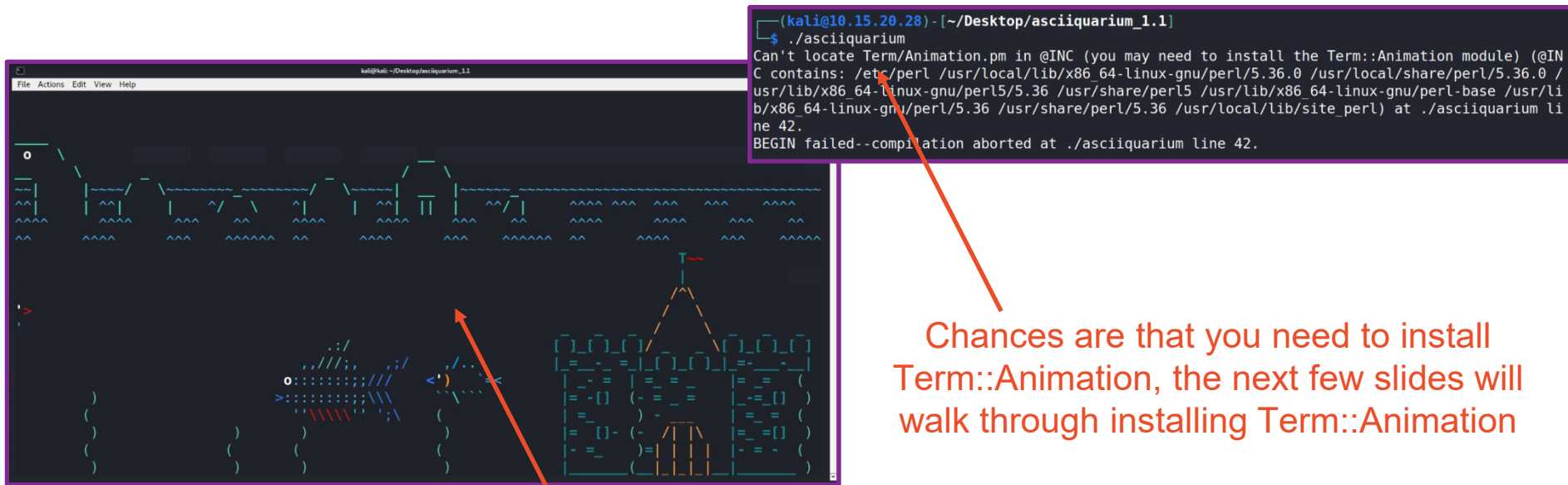
(kali@10.15.20.28) - [~/Desktop/asciiquarium_1.1]
└─$ ls
CHANGES  MANIFEST  README  asciiquarium  gpl.txt
```

Notice the `asciiquarium` has changed colors. The “`chmod +x`” command makes `asciiquarium` an executable file



Try It Again

- Try to execute the asciiquarium
`./asciiquarium`



```
(kali@10.15.20.28) - [~/Desktop/asciiquarium_1.1]
$ ./asciiquarium
Can't locate Term/Animation.pm in @INC (you may need to install the Term::Animation module) (@INC
contains: /etc/perl /usr/local/lib/x86_64-linux-gnu/perl/5.36.0 /usr/local/share/perl/5.36.0 /
usr/lib/x86_64-linux-gnu/perl5/5.36 /usr/share/perl5 /usr/lib/x86_64-linux-gnu/perl-base /usr/li
b/x86_64-linux-gnu/perl/5.36 /usr/share/perl/5.36 /usr/local/lib/site_perl) at ./asciiquarium li
ne 42.
BEGIN failed--compilation aborted at ./asciiquarium line 42.
```

Chances are that you need to install Term::Animation, the next few slides will walk through installing Term::Animation

Working asciiquarium

Installing Term Animation

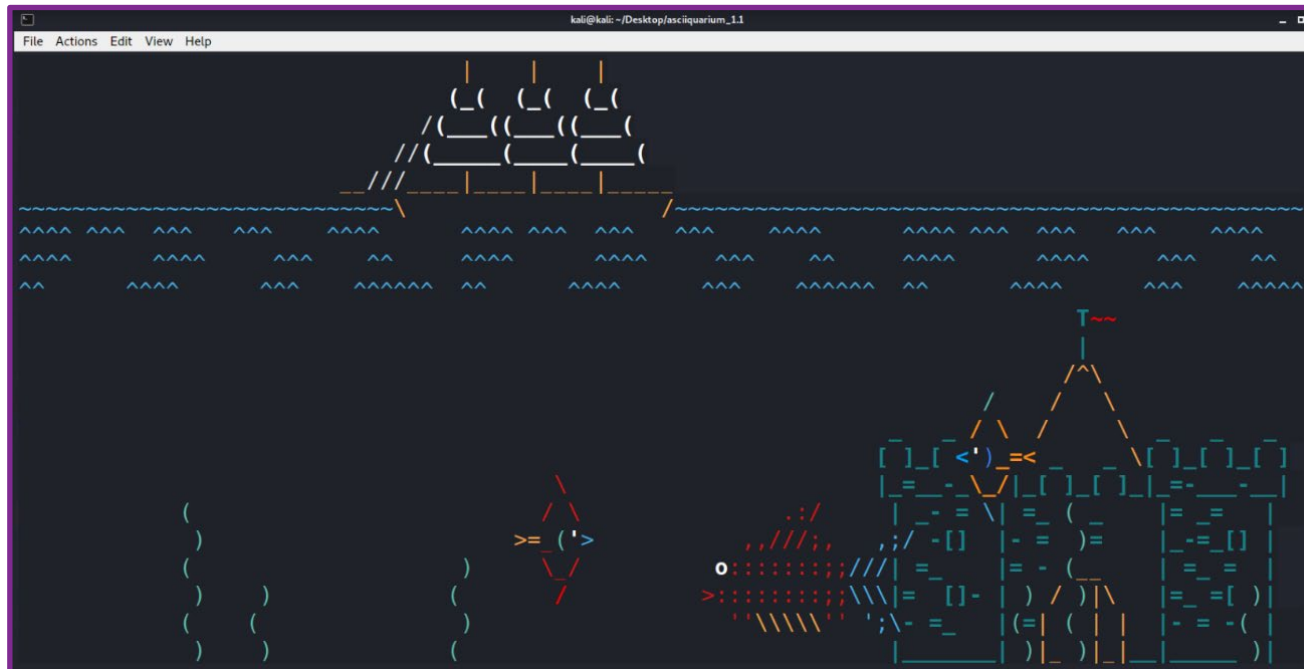
- Use the following commands to install Term-Animation
- `sudo apt-get install libcurses-perl`
- `cd /tmp`
- `wget http://search.cpan.org/CPAN/authors/id/K/KB/KBAUCOM/Term-Animation-2.4.tar.gz`
- `tar -zxf Term-Animation-2.4.tar.gz`
- `cd Term-Animation-2.4/`
- `perl Makefile.PL && make && make test`
- `sudo make install`

The “&&” command executes the next command if and only if the previous command succeeds.



Asciiquarium

- Let's try to run the aquarium again, navigate to the aquarium directory
`cd <path_to_asciiquarium>`
- Execute the aquarium
`./asciiquarium`



Press "q" or CTRL+C to exit the aquarium

